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The loss of an eye under any circumstances or conditions is a very serious affliction. The vacant stare and dull look of an artificial eye can never compensate, for one which may be disfigured by a leucoma or partial atrophy, for even such eyes are preferable to wearing glass ones, be they ever so well matched. No matter how smooth an artificial eye is polished, sooner or later the secretions corrode its surface and those irregular projections cause more irritation, and the result is more offensive secretions, which become dry and harden upon the surface of the eye, usually appearing as a horizontal band over the cornea. To morbid individuals, especially women, these results are, to say the least, disagreeable, and to the observer equally so.

The question has often arisen, How can we best overcome the necessity for an enucleation. Eyeballs are removed, as a rule, for three indications:

1. If wounded or cut in the ciliary region (the danger zone), to prevent sympathetic ophthalmia.
2. If atrophied, to make room for an artificial eye.
3. For new growths (tumors).

The first indication is the most important. If we can prevent sympathetic ophthalmia we also may save an eyeball; but by saving the eyeball we do not necessarily prevent sympathetic ophthalmia. In the second case an atrophied eyeball is disfiguring and is removed for cosmetic purposes, and because it may be a hiding place for new bone development, which may remotely produce sympathetic irritation. I have frequently removed a stump and found bone shells with edges as sharp as a splinter of glass. With such a foreign body irritating it, an optic nerve might readily be the focus of migratory ophthalmia.

Where a tumor exists we have but one recourse—enucleation.

At the October meeting of the *Société D'Ophtalmologie*,¹ of Paris, the question of resection or laceration of the optic nerve was discussed, especially by Drs. De Wecker, Chauvel, Gillet de Grandmont and others. Dr. De Wecker, who has had exceptional facilities for putting into practice the text of his teachings, made the following remarks.

“I propose to continue the campaign I have undertaken against the abuse of enucleation, and I firmly believe that by making more popular the simple resection of the optic nerve in cases where we have danger of migratory ophthalmia, no more eyes will be taken out, except when they are the seat of a neoplasm (tumors).

“If the transmission of migratory ophthalmia by the optic nerve is confirmed (and

¹ *Recueil D'Ophtalmologie*, October, 1890.

I am convinced of it), the simple resection of the nerve will afford a sure means of preventing it. Boucheron and Schoeler's method, which includes cutting the ciliary nerves, does not, however, answer the purpose. The only way to prove conclusively that resection of the optic nerve can take the place of enucleation is that a large number of resections shall be made and the results noted. The operation must also be made as simple as the operation for enucleation. If we were to follow the complicated operations as described by Schweigger or Pagenstecher it would certainly never become popular.

"Being aware of the difficulties which beset one, and fearing that in the midst of operation, by an unlucky cut of the scissors, a hemorrhage should follow, it occurred to me to forego the section of the nerve, which is the most difficult part of the operation, and simply to tear off the nerve near its optic entrance. This idea was suggested to me by the cases recorded, in which the eyes were torn out with the optic nerve attached, and also the savage custom of the Tyrolese wrestlers, who put eyes out by introducing their thumbs into the orbits on the temple side. I suppose that such displacement of the globe could only be effected after tearing off the nerve at its optic attachment. On a recent visit to the Tyrol, a wrestler presented himself with his eyeball hanging on his cheek and asked whether the eye could be replaced and be useful to him. Being answered in the negative, he seized the eyeball, tore it off and flung it to the ground. My experiments upon the cadaver

were made with a view to ascertain whether or not a nerve could be torn. With my double hook I have never been able to tear off the nerve at its entrance into the orbit, even when pulling with all my strength. All I could do was to sever the nerve by pulling with the hook; in other words, the hook cut its way through the nerve. On several occasions I succeeded in tearing the eyeball from the nerve, the vitreous humor escaping through the opening made by the head of the nerve disappearing. I also tried to tear the nerve off as it entered the orbital foramen; but I signally failed in this also. We have a well-known case, in which a drunken man fell against a door, the key of which was projecting, and the eye thrust itself through the ring of the key, the nerve being completely severed. In another case, a horn of a cow drove the eye into the maxillary sinus. Here also the nerve was severed. In these instances the traction did not act directly and exclusively on the optic nerve, as in my experiments on the dead body. In the case of the intoxicated man who thrust his eye through the ring of the key, all the weight of his body exerted a traction on the whole funnel-shaped bundle of muscles of the eyeball. The traction pressed on their insertions around the passage of the optic nerve into the orbit, and tore them off from their insertion simultaneously with the sheath—to which they are attached. This is also the reason why we do not find the tearing off of the nerve isolated; the internal rectus being always detached in this sort of traumatism. We must therefore give up the combined operation of resection and

tearing, in place of the simple resection. All that is left for us to do is to try to improve the operation of simple resection; to make it always feasible and easy so as to supplant the repulsive enucleation."

M. Chauvel who made some experiments upon the elongation of the optic nerve stated that he was never able to tear the nerve of the human eye, although he was able to do so in rabbits.

M. Gillet de Grandmont corroborated Dr. De Wecker's statements, especially those relating to tearing the globe from the nerve, and related an instance in which a woman in a fit of melancholy, suddenly thrust her index finger and thumb into her orbit. Her strength was so great that with her left hand she took hold of the eyeball, tore it off with three centimeters of the optic nerve, and threw it on an adjacent bed. This was the work of a few seconds. She made a similar attempt on the right eye, but the attendant seized her right hand, only, however, after the patient had succeeded in thrusting her index finger under the inferior muscles and had torn them from the globe. A severe hemorrhage followed, no other complications arose, and in a few days she recovered the sight in her right eye.

We miss very much in the foregoing remarks a description of the exact way in which De Wecker, Grandmont and others perform resection of the nerve.

A few years ago Mr. Brudnell Carter and Dr. T. Herbert Bickerton performed an operation for opening the sheath of the optic nerve in optic neuritis. Mr. Carter designed special instruments for this operation, and

the difficulties were made easy for exposing the optic nerve. In performing this operation, I found but little difficulty in following Carter's method. The one obstacle was, that the orbital fat would constantly get in the way. Dr. Shakespeare, who assisted at this operation, suggested a speculum shaped like Sims's uterine speculum. With this instrument the difficulties were overcome in a subsequent operation.

If resection of the optic nerve can be performed with complete protection against sympathetic ophthalmia, it will be a boon to many unfortunates. The wearing of an artificial eye is as annoying as it is unsightly.

The details of the operation for resection are essentially as follows. The lids are separated with the ordinary ophthalmostat; a vertical incision is made through the conjunctiva over the insertion of the external rectus muscle; the conjunctiva is dissected off as far back as the external canthus will permit. This exposes completely the muscle. Two silk threads are then passed through the muscle near its tendinous insertion. These threads will be required in a subsequent stage of the operation, to unite the detached muscle to the eyeball. The muscle is then cut and drawn to the temple side. This exposes the globe. With curved scissors, all tissue is then separated from the eyeball. The optic nerve is found by passing a hook—which is nothing more than a strabismus hook bent at a right angle. This hook brings forward the nerve, and then the retractor is passed downwards until it meets the nerve, and is then passed down and out,

keeping the adipose tissue out of the way. A second bent hook is inserted under the optic nerve, and also pressed backward. A certain portion of the nerve becomes exposed, and with a delicate flat forceps the nerve is grasped and held firmly. This is to prevent hemorrhage from the ophthalmic vein and artery (central) after the cut with the scissors. The eyeball is rotated forward, so that the non-severed nerve becomes exposed and a small piece of its bulbar end is cut off. By keeping pressure on the orbital end of the nerve for a few minutes, all danger of hemorrhage is aborted. The eyeball is then rotated into place, and the external muscle is re-adjusted. Over this the conjunctiva is replaced, and it is held in position with black silk, which may be removed in three days. Antiphlogistic dressings are applied day and night for several days. Very little reaction follows, and in a week or ten days the eye has assumed its normal appearance, with no disfigurement, and the action of the muscle is complete.

